ORDER NO. HAD8506153A4

Service Manual

Tuner

QUARTZ Synthesizer
FM/AM Stereo Tuner

ST-S77

Color

(K)...Black Type

Color	Areas
(K)	[PA]..... Far East PX.
(K)	[PE]..... European Military.

Please use this manual together with the service manual for Model No. ST–S77, Order No. HAD85042526C1.

CHANGES

■ REPLACEMENT PARTS LIST

Note:

(1) Mentioned in this parts list are only those changed in Model No. ST–S77 for destination [M] area.

Ref. No.	Change of Part No.		Part Name & Description	Pcs./Set	Remarks
	ST–S77 [M] →	ST–S77 [PA, PE]			
DIODE					
D914	————	MA165	Addition, Diode	1	
TRANSFORMER					
T701	SLT5J238	————	Deletion, Power Source	0	

Technics

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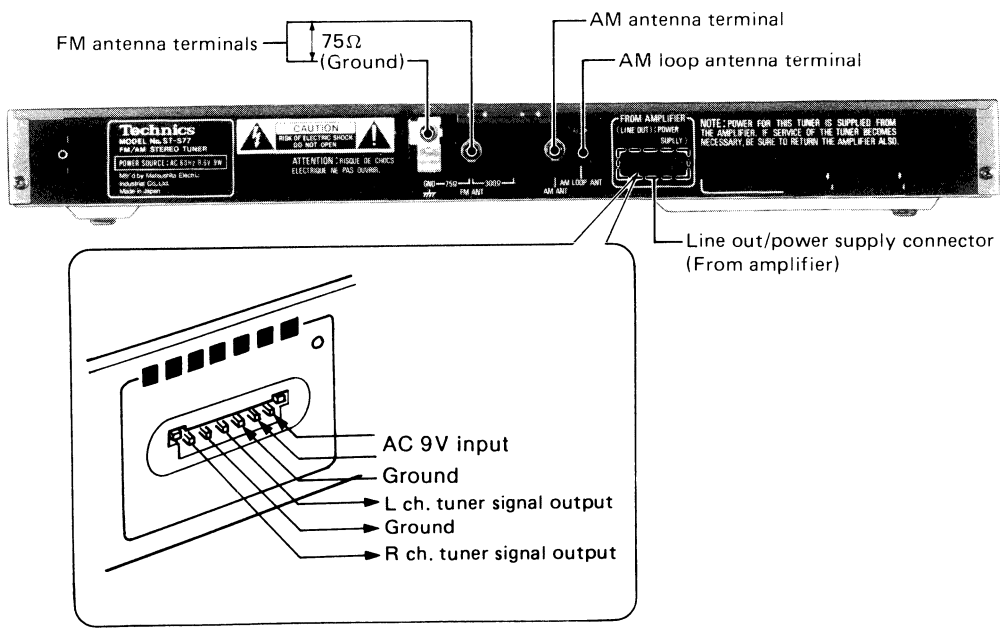
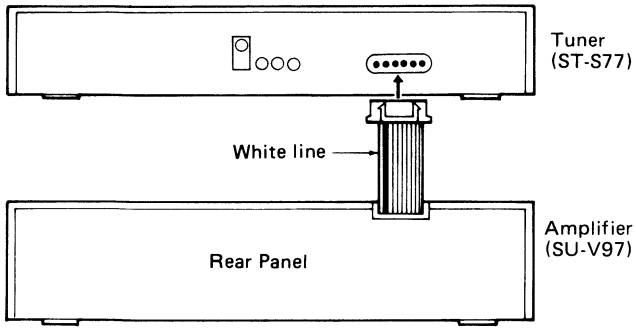
Ref. No.	Change of Part No. ST–S77 [M] → ST–S77 [PA, PE]		Part Name & Description	Pcs./Set	Remarks
CABINET and CHASSIS PARTS					
1	SGYTS77–KM	SGYTS77–KP	Front Panel Ass'y	1	
15	SJS9232B	————	Deletion, AC Outlet	0	
16	SJS9230	————	Deletion, AC Inlet	0	
17	SMX887	————	Deletion, Shield Cover	0	
18	SJS9232A	————	Deletion, AC Outlet Cover	0	
20	SJF8713N	SJF8401	Terminal Board	1	
21	RHR969ZA	————	Deletion, Lock Pin	0	
22	SGPTS77–KM	SGPTS77–KP	Rear Panel Ass'y	1	
23	Addition	SJS604	Socket	1	
ACCESSORIES					
A1	SJP2129–5	————	Deletion, Connection Cord	0	
A7	SQF12404	SQF12504	Instruction Book	1	
A8	SJA170	————	Deletion, AC Cord	0	
PACKING PARTS					
P5	SPG5273	SPG5382	Carton Box	1	
RESISTORS					
R1	ERDS1FJ104	————	Deletion, Carbon, 100kΩ, 1/2W, ± 5%	0	
R101	ERDS1FJ151	————	Deletion (Short), Carbon, 150Ω, 1/2W, ± 5%	0	
R301	ERDS2TJ393	ERDS2TJ333	Carbon, 33kΩ, 1/4W, ± 5%	1	
R710	ERC12ZGK335	————	Deletion, Solid, 3.3MΩ, 1/2W, ± 5%	0	
CAPACITORS					
C203	ECCD1H180KC	ECCD1H150KC	Ceramic, 15pF, 50V, ± 10%	1	Ⓢ
C908	ECCD1H470K	ECCD1H150KC	Ceramic, 15pF, 50V, ± 10%	1	Ⓢ

■ LOCATION OF CONTROLS





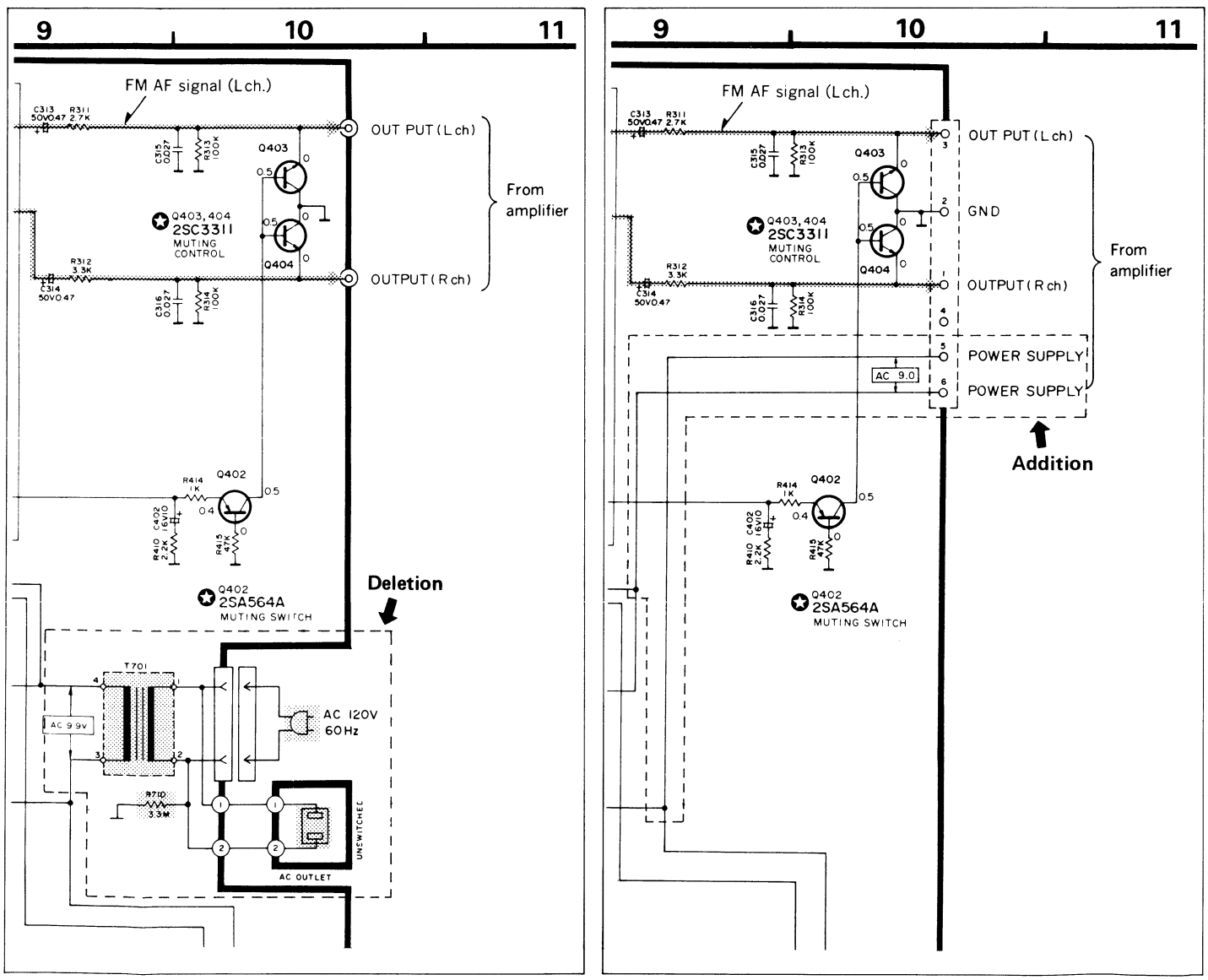
Connect the amp. and tuner as illustrated.

* Tuner (ST-S77) is not equipped with power supply. When checking or repairing the tuner, connect the amp (SU-V97) as illustrated or use the ST-S77 power supply jig. (Part No. SZZA1037C).

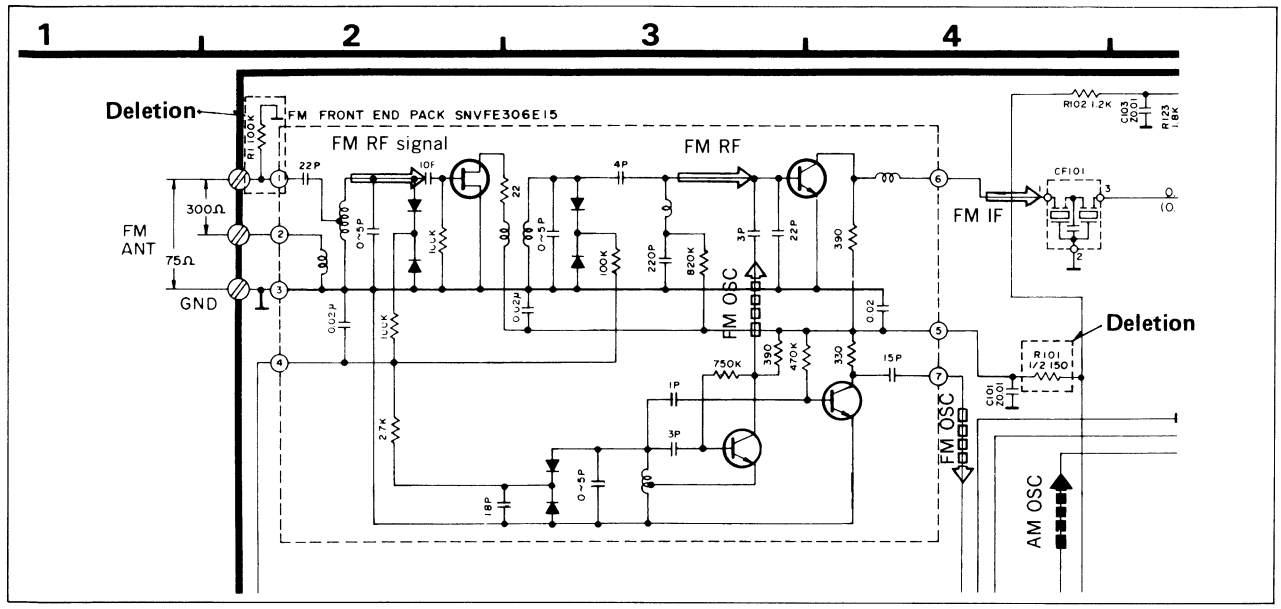
■ SCHEMATIC DIAGRAM

- **Change in power supply circuit**

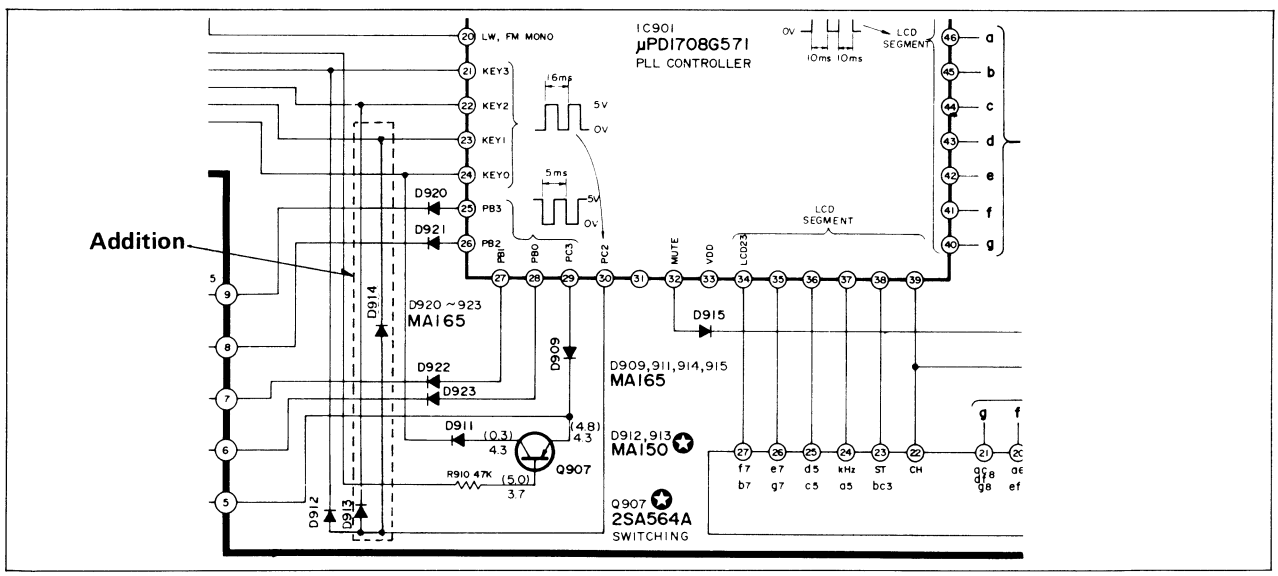
For [M] area ——— **CHANGE** ———▶ **For [PA], [PE] areas**



- **Deletional of resistors (R1, R101)**

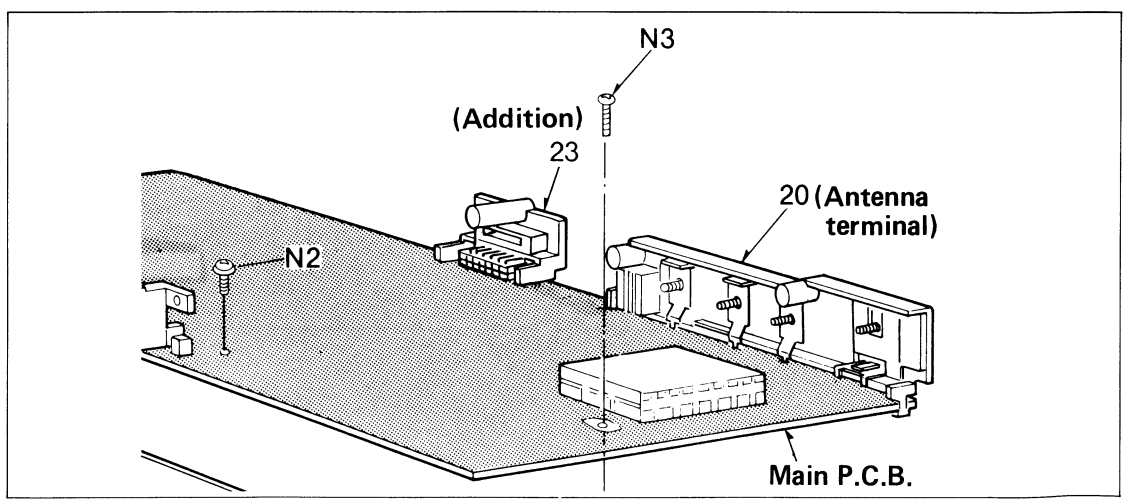


- **Additional of diode (D914)**



■ EXPLODED VIEW

- **Additional of socket (㉓)**



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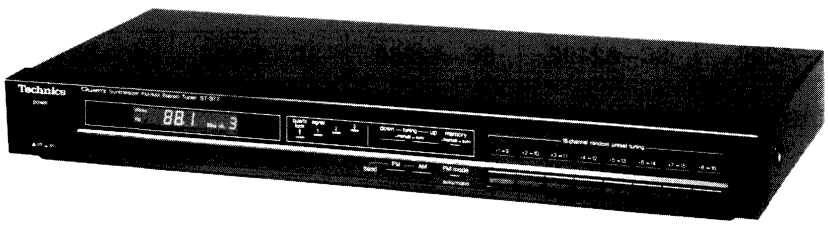
ORDER NO. HAD85042526C1
A2

Service Manual

Tuner

QUARTZ Synthesizer
FM/AM Stereo Tuner

ST-S77



Color

(K)...Black Type

Color	Areas
(K)	[M].....U.S.A.
(K)	[MC]...Canada.

System

SC-A200E
SC-A210E
SC-A220E
SC-A230E
SC-A240E

SPECIFICATIONS

(IHF '78)

■ FM TUNER SECTION

Frequency range	87.9~107.9 MHz (0.1 MHz step)
Sensitivity	10.8 dBf (0.95 μV/75Ω IHF'58)
50 dB quieting sensitivity	
MONO	18.1 dBf (2.2 μV/75Ω IHF'58)
STEREO	38.1 dBf (22 μV/75Ω IHF'58)
Total harmonic distortion	0.15% (MONO), 0.3% (STEREO)
S/N MONO	78 dB
STEREO	70 dB
Frequency response	20 Hz~15 kHz, +0.5 dB~−1.5 dB
Alternate channel selectivity (±400 kHz)	65 dB
Capture ratio	1.0 dB
Image rejection at 98.1 MHz	55 dB
IF rejection at 98.1 MHz	90 dB
Spurious response rejection at 98.1 MHz	80 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−35 dB
38 kHz	−50 dB
Antenna terminals	300 ohms (balanced) 75 ohms (unbalanced)

■ AM TUNER SECTION

Frequency range	530~1720 kHz (10 kHz step)
Sensitivity (S/N 20 dB)	20 μV, 300 μV/m
Selectivity (±10 kHz)	55 dB
Image rejection at 1000 kHz	40 dB
IF rejection at 1000 kHz	60 dB

■ GENERAL

Output voltage	0.6 V
Power consumption	9 W
Power supply	AC 60 Hz, 120V
Dimensions (W×H×D)	430 × 53 × 200 mm (16-15/16" × 2-3/32" × 7-27/32")
Weight	1.8 kg (4.0 lb.)

Specifications are subject to change without notice for further improvement.

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■ LINE-UP OF COMPONENTS

	SC–A200	SC–A210E	SC–A220E	SC–A230E	SC–A240E
Stereo Integrated Amplifier	SU–V57	SU–V77	SU–V97	SU–V97	SU–V97
Quarts Synthesizer FM/AM Stereo Tuner	ST–S77	ST–S77	ST–S77	ST–S77	ST–S77
Turntable System	SL–BD24U	SL–BD24U	SL–DD24U	SL–L1A	SL–D93U
Stereo Double Cassette Deck	RS–B17W	RS–B17W	RS–B17W	RS–B27W	RS–B27W
Stereo Graphic Equalizer	———	SH–8027	SH–8033	SH–8033	SH–8033
Hi-Fi Speaker Systems	SB–2525	SB–2565	SB–2565	SB–2585	SB–2585

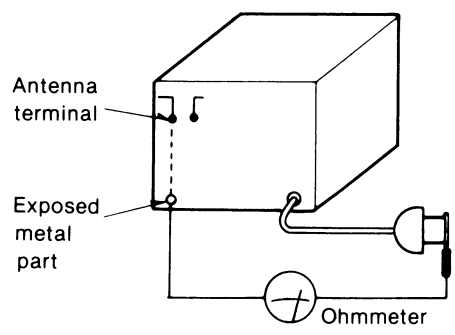
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

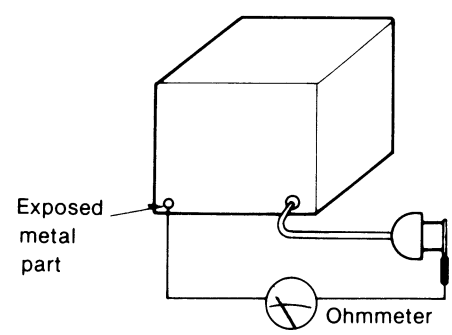
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS

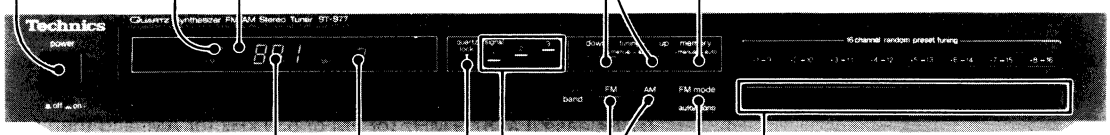
• Power switch (power)
Before turning the power on, make sure the volume control of the amplifier is set to the low position.

• FM stereo indicator (stereo)
This indicator automatically illuminates when an FM stereo broadcast is being received.
Note:
It will not illuminate if the FM mode selector is pressed.

• Memory indicator (memo)
This indicator illuminates when the memory button is pressed.

• Tuning buttons (tuning)
If the button is pressed momentarily and then released, the frequency will change at intervals of 0.1 MHz for FM and 10 kHz for AM. If the button is pressed slightly longer and then released, the station will be selected automatically. If the broadcast signals are weak, it may not be possible to make automatic selection. If this occurs, make the selection manually.

• Memory button (memory)
This button is used when preset memory setting of the preset-tuning buttons is made.
Refer to page 4 for information concerning preset tuning.



Digital frequency display
The reception frequency of the FM or AM broadcast selected by using the tuning buttons or the preset tuning buttons is indicated by a digital-type display.

Channel display
The channel number selected by the preset-tuning buttons is displayed.

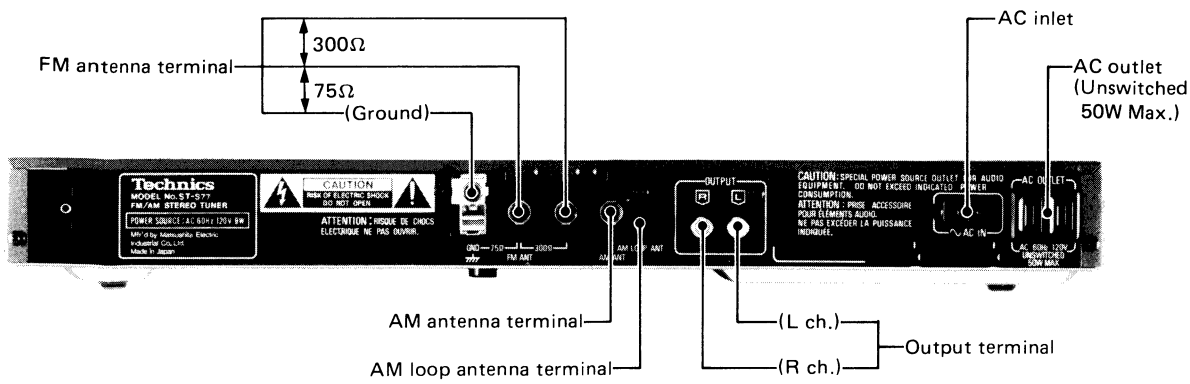
Quartz-lock indicator (quartz lock)
This indicator illuminates when tuned precisely to an FM or AM station.

• Preset-tuning button (1 ~ 16) (16 channel random preset tuning)
These buttons are used to preset FM and AM broadcast frequencies into the memory of this unit, and are also pressed to select the desired preset frequencies.
Note:
Refer to page 4 for information concerning the preset memory.

• FM mode selector (FM mode)
This unit automatically switches to the stereo mode when a stereo broadcast is received. Press this button to listen in the monaural mode. The stereo indicator will not illuminate in the monaural mode.

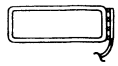
• Band selectors (band)
FM:
Press this button to listen to an FM broadcast.
AM:
Press this button to listen to an AM broadcast.

• Signal-strength indicators (signal)
These indicators show the relative strength of broadcast signals being received by the antenna. The best condition for reception, for FM and AM, is when the indicators illuminate completely to the top.



■ HOW TO PRESET RADIO BROADCAST FREQUENCIES

Important!



AM loop antenna

If this antenna is not installed, AM broadcasts will not be received.

With ST-S77 you may preset as many as 16 radio broadcast frequencies: FM/AM random presetting. After broadcast frequencies have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.

Automatic memory presetting

The FM broadcasting stations and AM broadcasting stations will be automatically preset to "channels" 1 through 16 for FM and 9 through 16 for AM, respectively. When AM is automatically preset, the FM stations on channel 9 through 16 will be replaced by the new AM stations.

1 Power: "on" (▮→ ▂)

2 Press the "FM" or "AM" button.

3 Set to the lowest frequency.

- **To preset FM broadcasting stations: Set to 87.9 MHz.**
- **To preset AM broadcasting stations: Set to 530 kHz.**

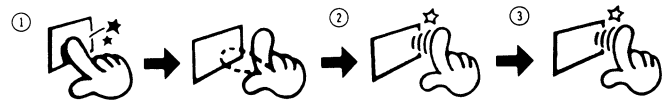
Tuning

Press the left button to change the frequency downward, and press the right button to change the frequency upward.

① Press the button and hold slightly (frequency will change continuously).

② Release it at 87.9 MHz for FM or 530 kHz for AM, and then press the button again momentarily (frequency change will stop).

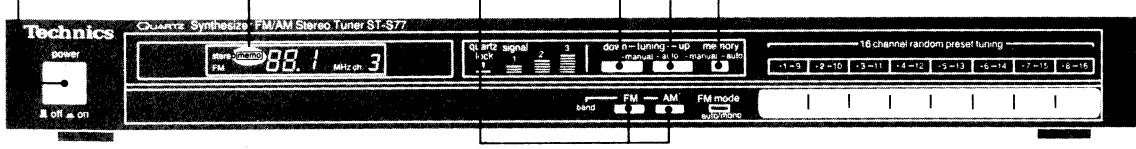
③ Press the button momentarily (frequency will change each time the button is pressed), and tune to one of the above frequencies.



4 Press. When the frequency indication begins to change, release.

(The frequency will change upward, and the automatic presetting will begin with the broadcasting station of the lowest frequency and will continue in order.)

Memory indicator



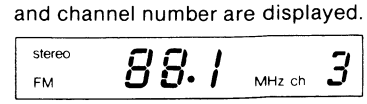
Tuner (ST-S77)

5 Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet.

- **To check the front channels (CH 1~ 8):**

Press momentarily.

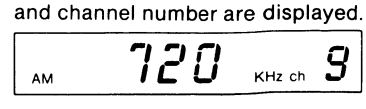
Frequency stored in the memory and channel number are displayed.



- **To check the back channels (CH 9~ 16):**

Press slightly longer.

Frequency stored in the memory and channel number are displayed.



Notes:

1. In areas where there are less than 16 FM stations, the remaining channels (through channel 16) will be left empty. The empty channels can be filled by using manual memory presetting.
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.
3. For AM broadcasts with extremely strong signal transmissions, the frequency memorized may be slightly off of the correct frequency. If this occurs, use the manual control to memorize.

■ "Most-recent" memory

The most-recent memory is a system by which the unit "remembers" the FM or AM broadcast station last heard when any of the functions of this unit are turned off, and automatically tunes to that station the next time the power is turned on.

■ "Back-up" memory

This is the function which preserves the preset memory and most-recent memory functions. In the event of a power failure, or if the power cord of the tuner is disconnected from the electric outlet, the back-up memory will preserve the preset memory and most-recent memory functions for as long as approximately one week.

■ To prevent erasing the memory

If the power supply is interrupted for one week or longer, the memory settings will be erased.

For example:

1) If the power cord of the tuner is disconnected from the AC outlet of the amplifier,
2) If an audio timer is used and the timer does not operate the tuner for a week or longer,
3) If a power failure occurs, etc.

If any of the above occurs, the memory will have to be reset. The memory in this tuner is maintained by a gold capacitor. If the power supply is interrupted for a week or longer, set the power switch of the tuner to the "on" position for thirty minutes or more in order to recharge the gold capacitor. Then reset the memory.

Manual memory presetting

Stations can be freely preset to any desired channel.

1 Power: "on" (■→ ▬)

2 Press the "FM" or "AM" button.

3 Press the appropriate tuning button to tune to the desired broadcast.

Tuning

Press the left button to change the frequency downward, and press the right button to change the frequency upward.

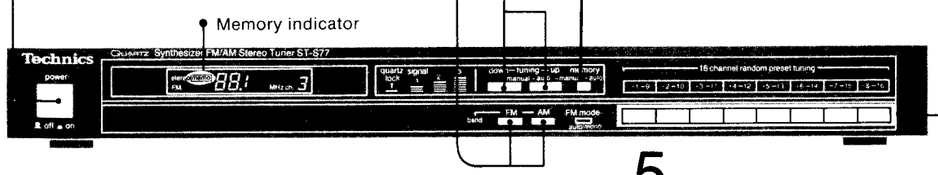
- **Automatic tuning**
  Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically).
  Repeat this operation until the desired station is found.
- **Manual tuning**
  Press the button momentarily and tune to the desired station. The frequency will change each time the button is pressed.

4 Press momentarily, and then release.

(The memory indicator will illuminate for approximately 4 seconds.)

Note:

If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically.
To stop the automatic memory presetting, once again press either the "up" button or the "down" button.



5 While the memory indicator is illuminated, press the button of the desired channel.

When the button is pressed, the memory indicator illumination will stop, and the presetting is complete.

- **To preset channels 1 through 8:**
  Press the button momentarily, and then release. (Preset channel number is displayed on the channel display.)
- **To preset channels 9 through 16:**
  Press the button slightly longer, and then release. (Preset channel number is displayed on the channel display.)

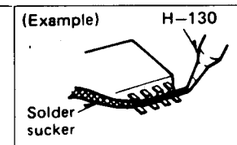
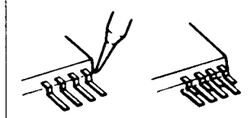
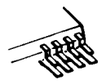
6 Enter the name (call sign, etc.) of the preset broadcasting station on the station memory file sheet.

This completes the procedures for presetting radio broadcast frequencies. The other preset-tuning buttons can be preset in the same way by following steps (2) through (6).

Note:

1. If the memory indication illumination stops before you press the button, once again repeat step (4) and then step (5).
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

■ HOW TO REPLACE IC'S (Small outline type)

	Replacing procedure		Cautions
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.	(Example) H—130 	● **Recommended tool** .....Special soldering iron *H605M and H—130. *H605E and H—130. ● Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil. ● When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil. ● When using a pencil type soldering iron. 1. Completely remove the solder from each IC pin by use of solder sucker. 2. Raise each pin by means of an eyeleteer, hold the pliers then remove IC package from P.C.B.
2	Melt the solder on the pin (one electrode) with the soldering iron.		
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.		
4	Remove each pin from the foil according to the above-mentioned procedure.		

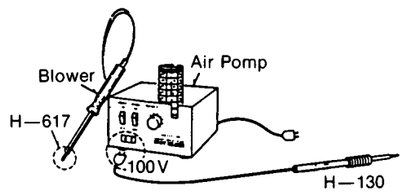
*** Special soldering iron**

(Refer to Technical Information, ORDER NO. GAD84125486T1)...For U.S.A. and Canada
(Refer to Technical Information, ORDER NO. GAD84115476T8)...For others

- **H—605 Spot Heater (hot-air solder iron)**

This device that uses hot air to melt solder was developed to remove Flat-Pakage ICs, RHCs and chip parts.

- H—605M (For 120V power source)
- H—605E (For 200V/220V/240V power source)



- **H—617 Twin Nozzle (for spot heater)**

Special nozzle for the removal of RHCs and chip resistors. (Nozzle diameter : 1.0 mm x 2)

- **H—130 Slim Pencil Solder Iron**

An ultrasmall ceramic heater solder iron is extremely handy for soldering chip parts, RHCs, ICs, etc., to high-density circuit boards.

Features:

● Rated power:	100V, 15W
● Max. temp.:	400°C
● Heater:	ceramic (long life)
● Insulation resistance:	100MΩ
● Length:	178 mm
● Weight:	16 g (not including cord)

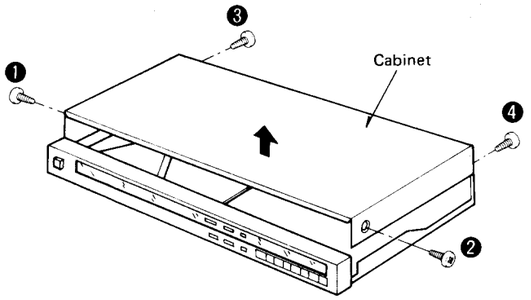
- **H—131, H—V13 Cap Bits**

Solder tip for the slim pencil Solder Iron and is composed of a bit holder and a corrosion resistance solder tip.
Permits changing of solder tips even while still hot.

● Solder tip:	0.3 mm

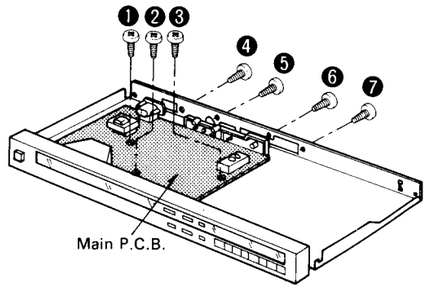
■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet
Procedure 1	• Remove the 4 screws (❶ ~ ❹).



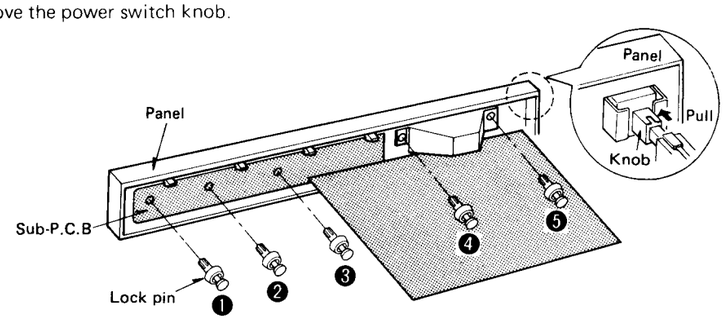
• Slightly pull the front panel toward you and remove the main P.C.B.

Ref. No. 2	How to remove the main P.C.B.
Procedure 1 ➡ 2	• Remove the 7 screws (❶ ~ ❼).



• Remove the 3 screws (❽ ~ ❿).

Ref. No. 3	How to remove the Sub-P.C.B. and front panel
Procedure 1➡2➡3	1. Remove the 5 lock pins. (❶ ~ ❺) 2. Remove the power switch knob.



■ BEFORE REPAIR

The power switch of this unit is located on the secondary side of the power transformer. Be sure to disconnect the power cord from the socket before servicing. Also, do the following before repair of digital circuits.

(1) Disconnect the power cord from the socket.
(2) Using a 10Ω, 1W resistor, short circuit electrolytic "gold" capacitors C911 and C912 momentarily to discharge them.

■ MEASUREMENTS AND ADJUSTMENTS

• AM/FM

Equipment used

- AM and FM signal generator (AM and FM-SG).
- Stereo modulator
- Distortion analyser
- Oscilloscope
- AC and DC electronic voltmeter (EVM)
- Frequency counter
- Choke coil (100μH)
- Resistor (100kΩ)
- Ceramic capacitor (200pF)

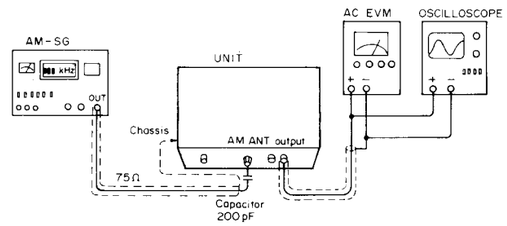
Note: For **T201** (AM-IFT) and **L204** (AM OSC coil), adjusted parts are supplied. So do not turn the cores of these parts.

AM-RF ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**AM**" position.
3. Place the radio frequency display and signal generator setting to **600 kHz**.
4. Adjust **L205** for maximum output.
5. Place the radio frequency display and signal generator setting to **1500 kHz**.
6. Adjust **CT202** for maximum output.
7. Repeat steps 3 ~ 6.

Note: Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION
Modulation 30%
Modulation frequency..... 400 Hz

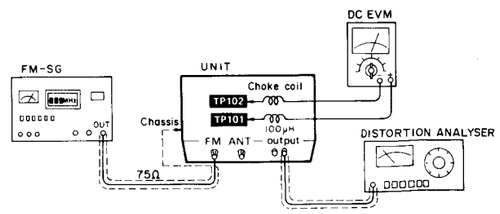


FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" position.
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Adjust **T101** core so that voltage measured in signal mode is **0 mV (0 ± 50 mV)** in 1V range.
5. Adjust **T102** so that the distortion factor of L ch is minimized.
6. Repeat steps 4 and 5 a few times.
7. Make sure that the distortion factors of L ch and R ch are nearly the same with each other and are less than **0.7%**.

Note: The adjusting screwdriver used should be made of resin.

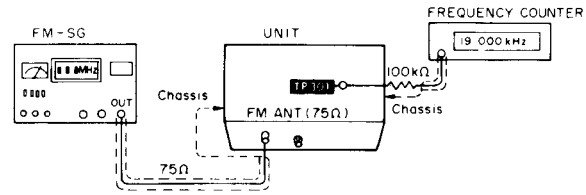
FM SIGNAL GENERATOR CONDITION
Modulation..... 100%
Modulation frequency..... 400 Hz
Output level..... 66 dB



FM STEREO ADJUSTMENT (FREE RUN)

1. Test equipment connection is shown in figure.
2. Set the unit into "**FM auto**" position. (by FM mode select button).
3. Place the radio frequency display and signal generator settint to **100.10 MHz**
4. Adjust **VR302** for **19 kHz ± 50 Hz** on frequency counter reading.

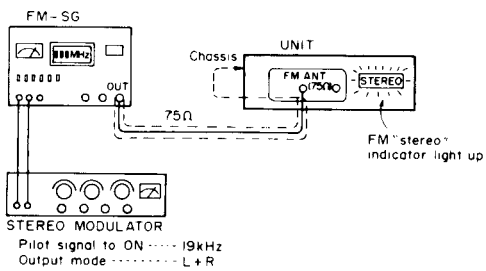
FM SIGNAL GENERATOR CONDITION
Modulation 0
Modulation frequency..... 0
Output level..... 66 dB

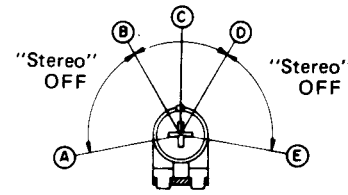


USING ALTERNATE SYSTEM

1. Apply stereo signal from generator or receive the stereo broadcast.
2. Adjust **VR302** until stereo indicator light up. Cement arm of **VR302** as shown figure.

FM SIGNAL GENERATOR CONDITION
Modulation..... 10%
Modulation frequency..... Pilot (19 kHz)
Output level..... 66 dB

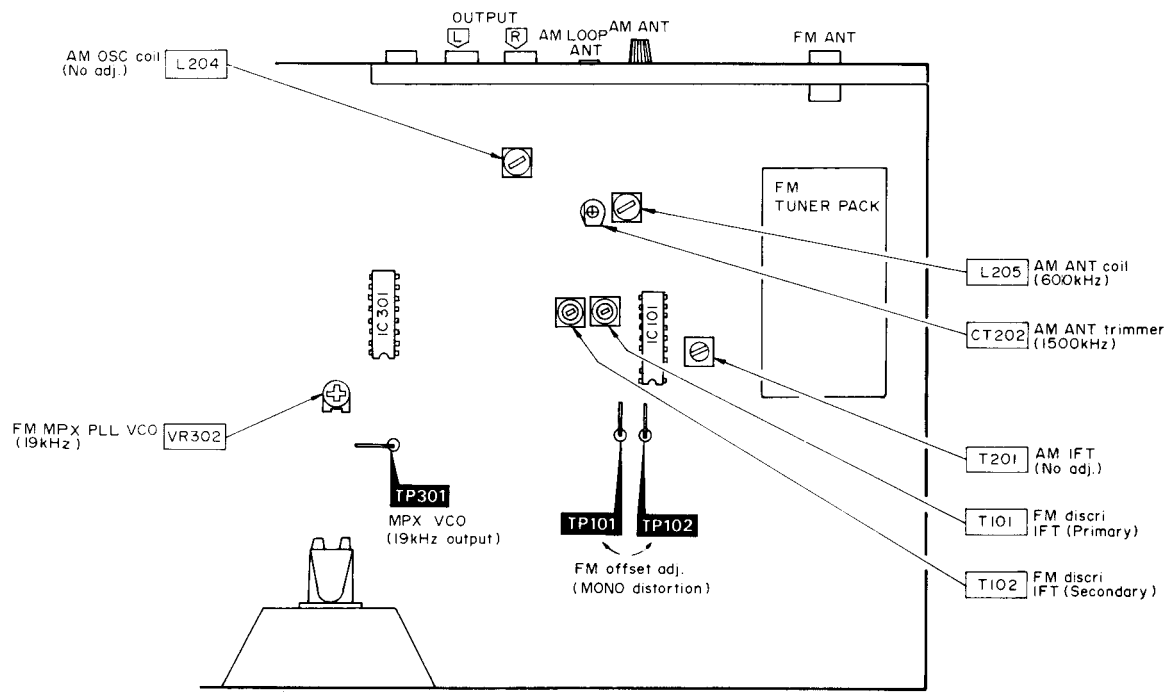




VR302

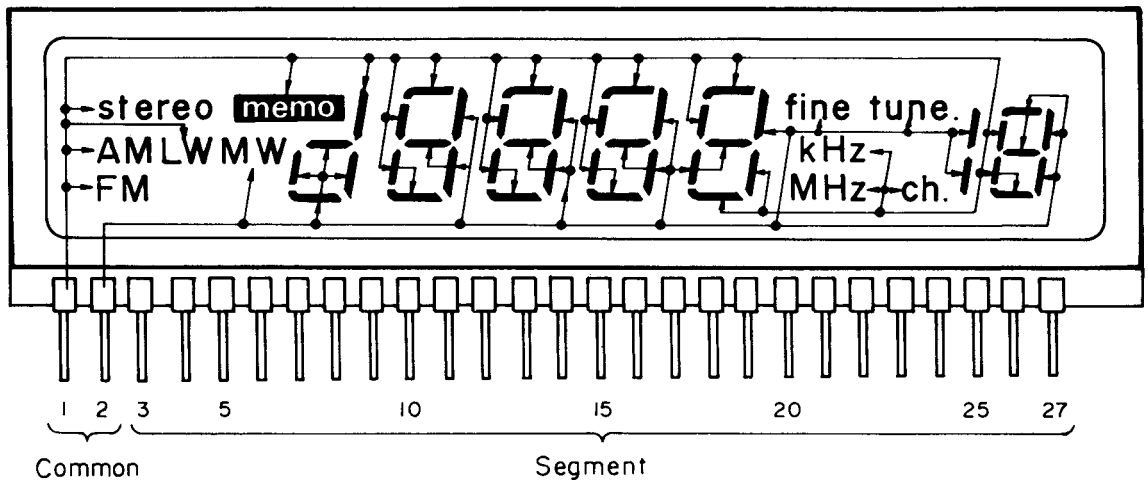
Ⓑ–Ⓓ ..... "Stereo" ON position (Indicator lighting)
Ⓒ ..... Adjust point of pilot circuit

• Adjustment points

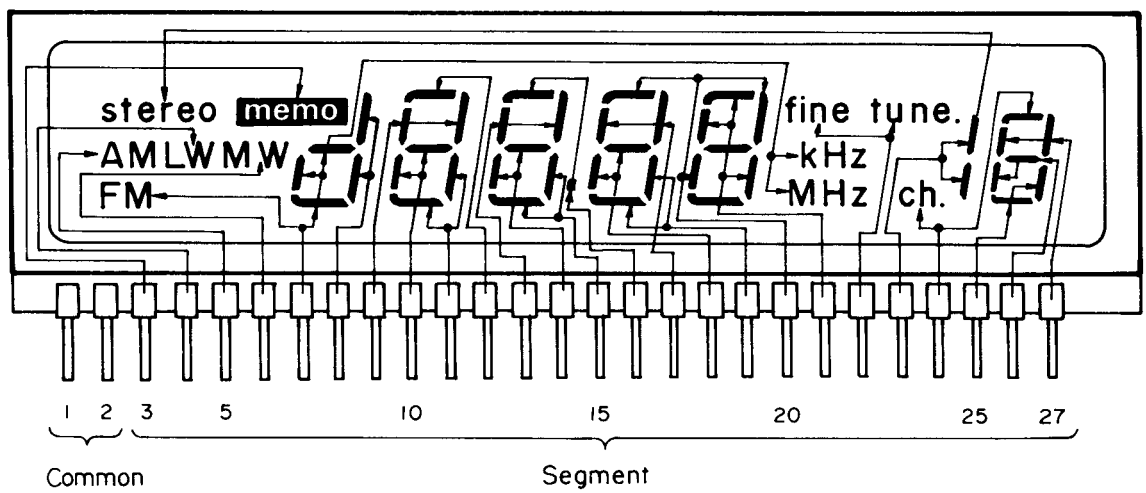


■ LIQUID CRYSTAL DISPLAY (LCD)

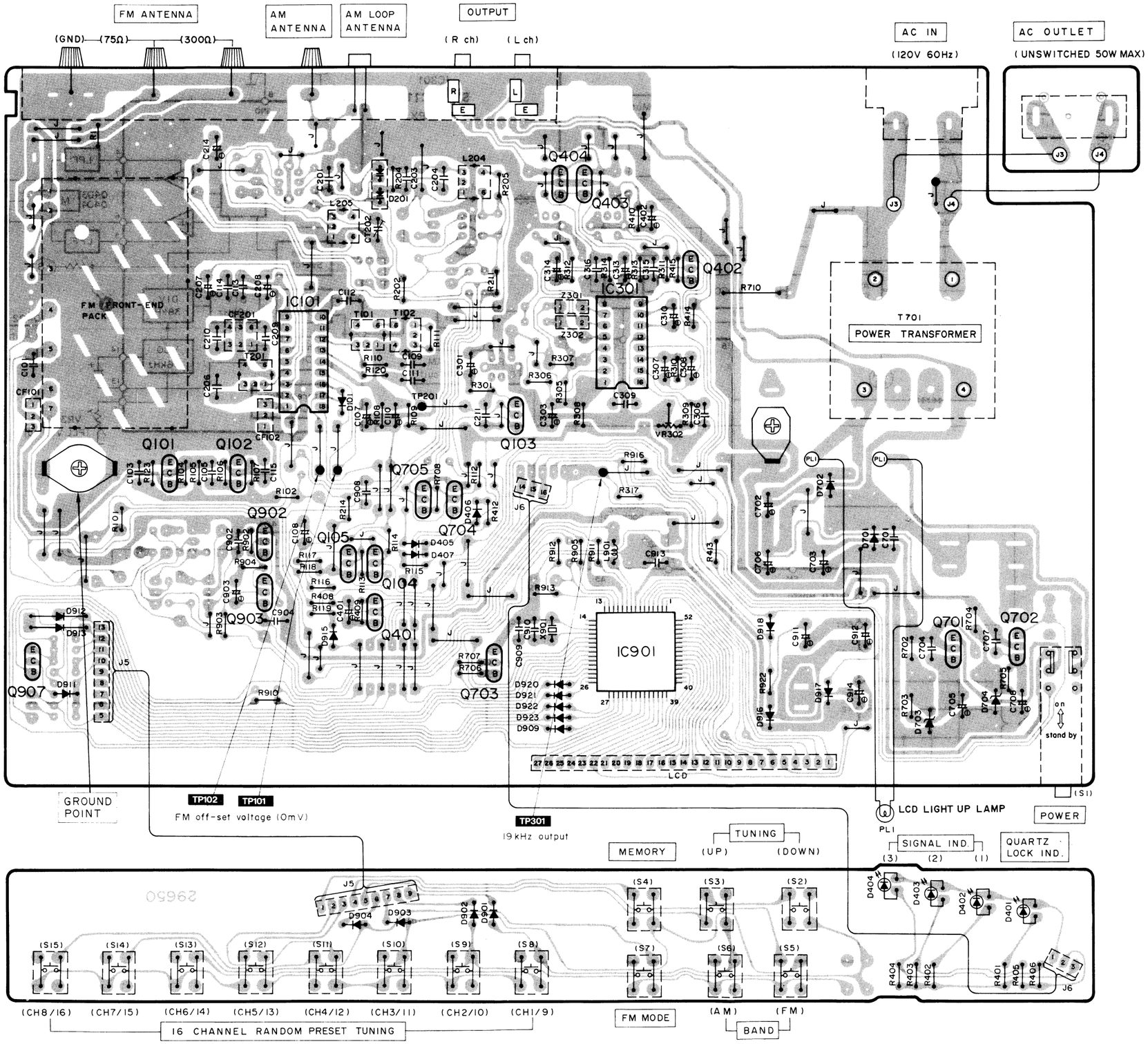
- **Common terminal (No. 1, 2)**



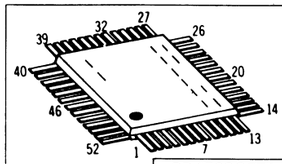
- **Segment terminal (No. 3 ~ 27)**



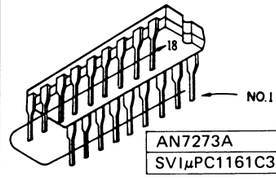
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



■ TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODES

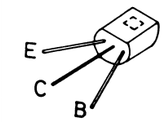


μPD1708G571	52 pin

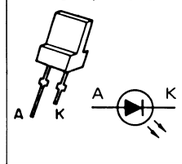


AN7273A	18 pin
SVIμPC1161C3	16 pin

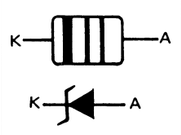
2SC829, 2SC945
2SC1384, 2SC1685
2SA564



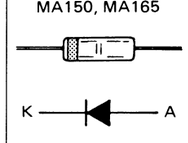
LN446YP, LN846RP



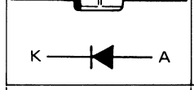
MA4150, MA4062



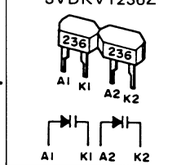
1SR35200
MA150, MA165



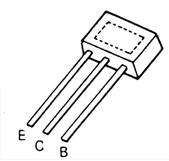
MA27W–A
Red mark



SVDKV1236Z



2SC3311



■ RESIS

Notes: 1. Part n
Pleas
2. Impo
Comp
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these
parts.

Numbering S

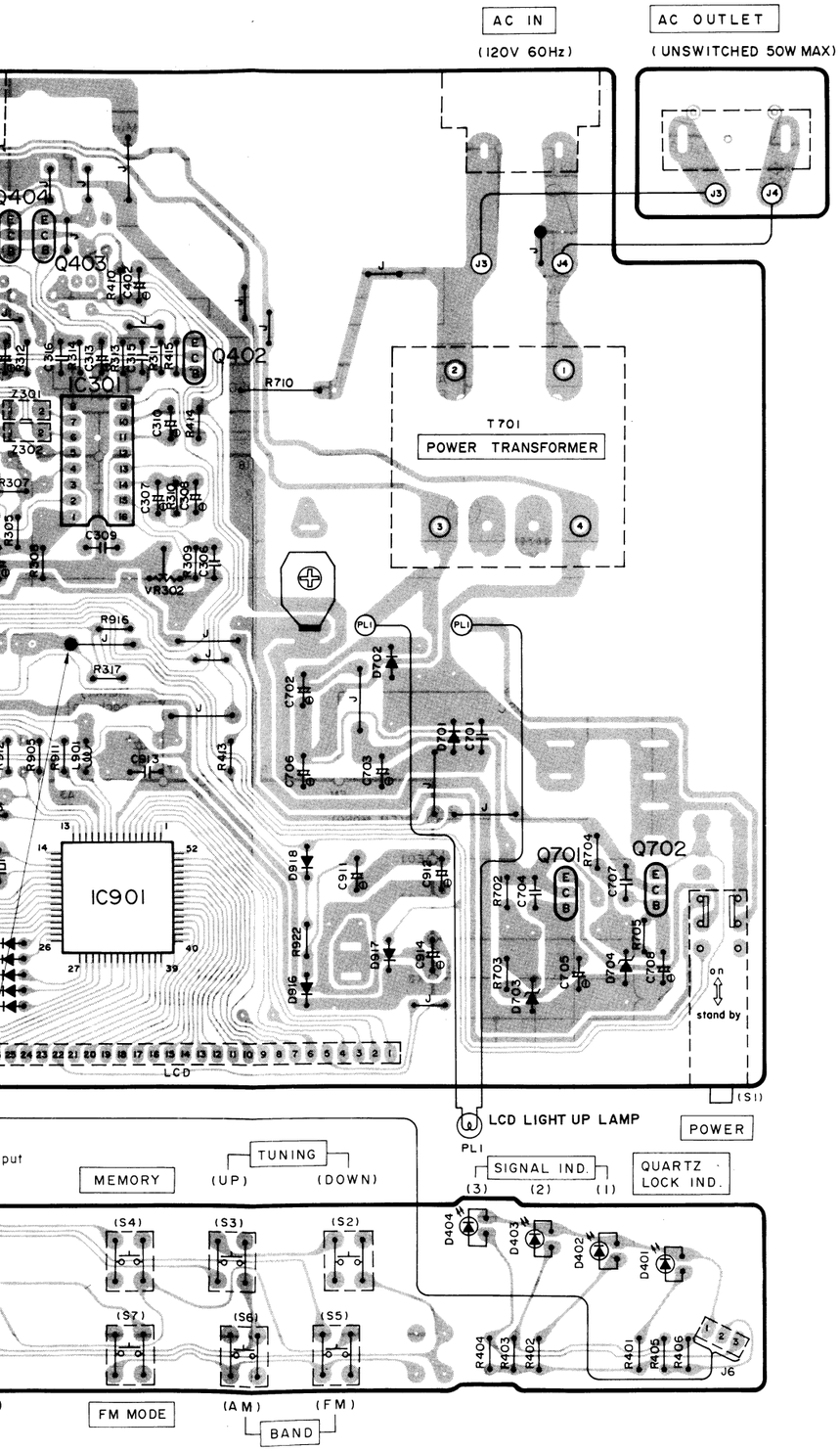
Example

ERD	25
Type	Wattag

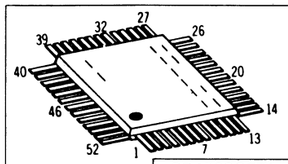
Resistor Type	
ERD	: Carbon
ERC	: Solid

● RESISTORS

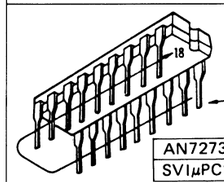
Ref. No.	Pa
R1	ERDS1
R101	ERDS1
R102	ERDS2
R104	ERDS2
R105	ERDS2
R106	ERDS2
R107	ERDS2
R108	ERDS2
R109	ERDS2
R110	ERDS2
R111	ERDS2
R112	ERDS2
R113	ERDS2
R114	ERDS2
R115	ERDS2
R116	ERDS2
R117	ERDS2
R118	ERDS2
R119	ERDS2
R120	ERDS2
R123	ERDS2
R202	ERDS2
R204	ERDS2
R205	ERDS2
R211	ERDS2
R214	ERDS2
R301	ERDS2
R305, 306	ERDS2
R307	ERDS2
R308	ERDS1
R309	ERDS2
R310	ERDS2
R311, 312	ERDS2



■ TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODES



μPD1708G571	52 pin



AN7273A	18 pin
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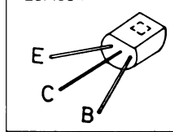
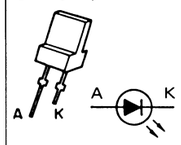
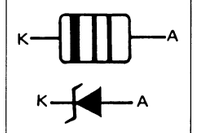
2SC829, 2SC945
2SC1384, 2SC1685
2SA564



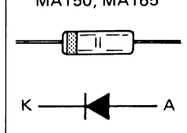
LN446YP, LN846RP



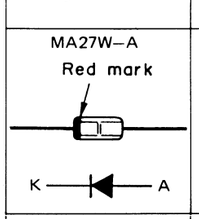
MA4150, MA4062



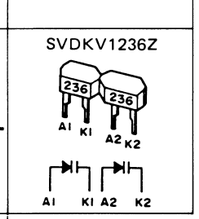
1SR35200
MA150, MA165



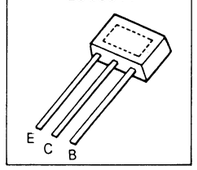
MA27W–A
Red mark



SVDKV1236Z



2SC3311



■ RESISTORS AND CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is OHM (Ω). K = 1000Ω M = 1000kΩ
5. The unit of capacitance is MICROFARAD (μF) P = 10^{-6} μF

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ±5%
ERC : Solid	S2 : 1/4W	

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage: ECEA Type	Voltage: Other	Tolerance
ECEA : Electrolytic	0J : 6.3V	1H : 50V DC	C : ±0.25pF
ECCD : Ceramic	1A : 10V	2H : 500V DC	J : ±5%
ECKD : Ceramic	1C : 16V	2R3 : 2.3V DC	K : ±10%
ECQM : Polyester	1E : 25V	1 : 125VDC	Z : +80%, −20%
ECQP : Polypropylene	1H : 50V		
EECW : Liquid electrolyte double layer capacitor	50 : 50V		
	25 : 25V		

● RESISTORS

Ref. No.	Part No.	Value
R1	ERDS1FJ104	100K
R101	ERDS1FJ151	150
R102	ERDS2TJ122	1.2K
R104	ERDS2TJ474	470K
R105	ERDS2TJ122	1.2K
R106	ERDS2TJ824	820K
R107	ERDS2TJ271	270
R108	ERDS2TJ102	1K
R109	ERDS2TJ471	470
R110	ERDS2TJ822	8.2K
R111	ERDS2TJ222	2.2K
R112	ERDS2TJ104	100K
R113	ERDS2TJ223	22K
R114	ERDS2TJ274	270K
R115	ERDS2TJ563	56K
R116	ERDS2TJ471	470
R117	ERDS2TJ104	100K
R118	ERDS2TJ153	15K
R119	ERDS2TJ822	8.2K
R120	ERDS2TJ561	560
R123	ERDS2TJ182	1.8K
R202	ERDS2TJ102	1K
R204	ERDS2TJ104	100K
R205	ERDS2TJ821	820
R211	ERDS2TJ122	1.2K
R214	ERDS2TJ474	470K
R301	ERDS2TJ393	39K
R305, 306	ERDS2TJ223	22K
R307	ERDS2TJ274	270K
R308	ERDS1FJ151	150
R309	ERDS2TJ153	15K
R310	ERDS2TJ102	1K
R311, 312	ERDS2TJ272	2.7K

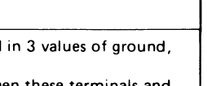
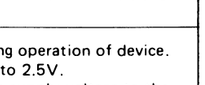
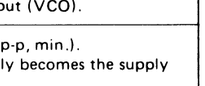
Ref. No.	Part No.	Value
R313, 314	ERDS2TJ104	100K
R317	ERDS2TJ103	10K
R401	ERDS2TJ821	820
R402	ERDS2TJ331	330
R403	ERDS2TJ271	270
R404	ERDS2TJ221	220
R405	ERDS2TJ122	1.2K
R406	ERDS2TJ561	560
R408	ERDS2TJ182	1.8K
R409	ERDS2TJ563	56K
R410	ERDS2TJ222	2.2K
R412	ERDS2TJ123	12K
R413	ERDS2TJ562	5.6K
R414	ERDS2TJ102	1K
R415	ERDS2TJ473	47K
R702	ERDS2TJ102	1K
R703	ERDS2TJ101	100
R704	ERDS2TJ102	1K
R705	ERDS2TJ101	100
R706	ERDS2TJ104	100K
R707	ERDS2TJ103	10K
R708	ERDS2TJ473	47K
R710 ⚠	ERC12ZGK335	3.3M
R902	ERDS2TJ562	5.6K
R903	ERDS2TJ103	10K
R904	ERDS2TJ561	560
R905	ERDS2TJ102	1K
R910	ERDS2TJ473	47K
R911	ERDS2TJ102	1K
R912	ERDS2TJ123	12K
R913	ERDS2TJ472	4.7K
R916	ERDS2TJ563	56K
R922	ERDS2TJ681	680

● CAPACITORS

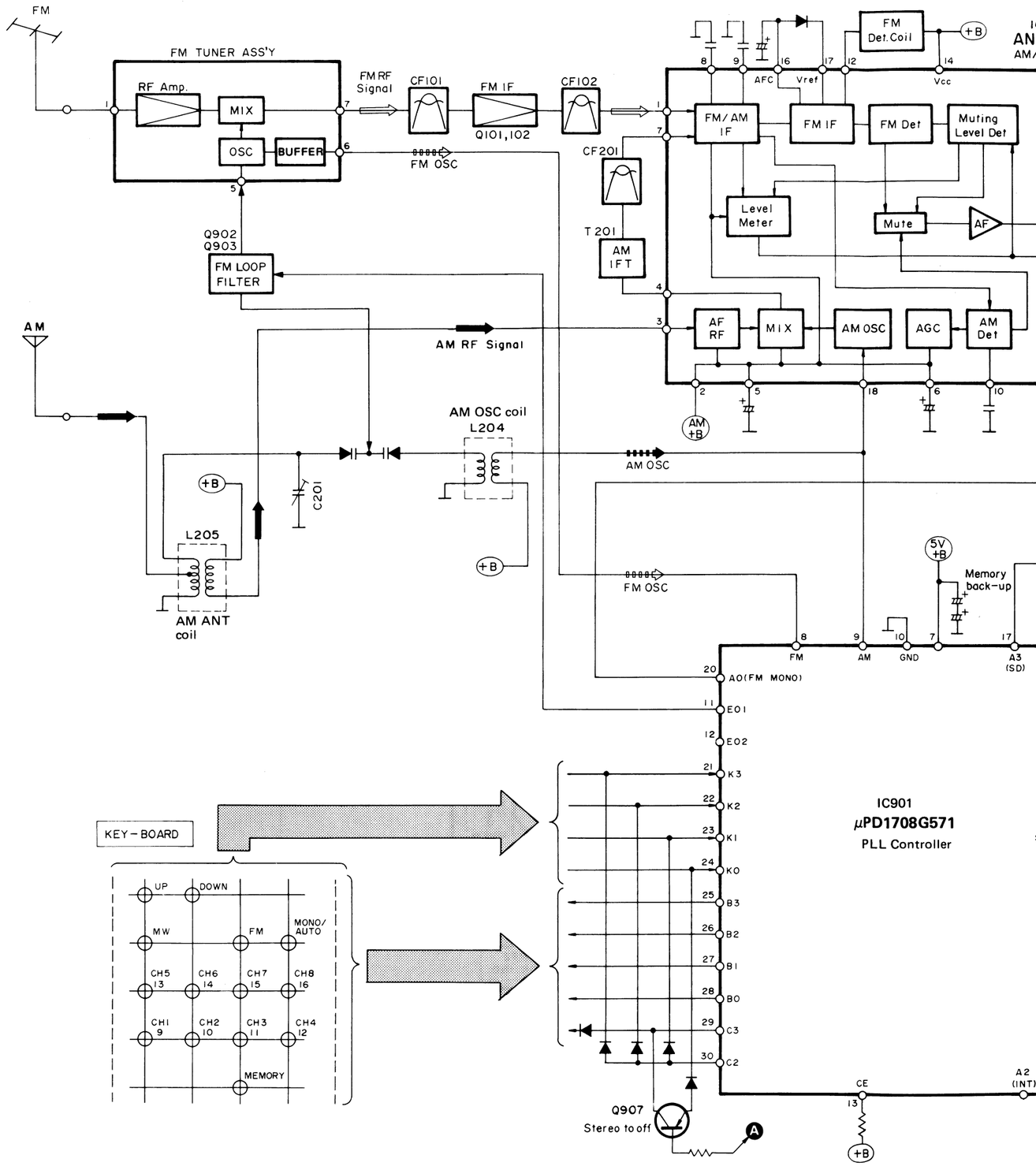
Ref. No.		Part No.	Value
C101	Ⓢ	ECKD1H103ZF	0.01
C103	Ⓢ	ECKD1H103ZF	0.01
C105	Ⓢ	ECCD1H150KC	15P
C107		ECEA1HK010	1
C108		ECEA1CU100	10
C109	Ⓢ	ECKD1H103ZF	0.01
C110		ECEA1CU100	10
C111	Ⓢ	ECCD1H101K	100P
C112, 113	Ⓢ	ECKD1H223ZF	0.022
C114	Ⓢ	ECKD1H223ZF	0.022
C115	Ⓢ	ECCD1H100KC	10P
C201	Ⓢ	ECQM1H473JZ	0.047
C203	Ⓢ	ECCD1H180KC	18P
C204		ECQP1471JZ	470P
C206	Ⓢ	ECKD1H223ZF	0.022
C207		ECEA0JU101	100
C208		ECEA1VU4R7	4.7
C209	Ⓢ	ECCD1H080CC	8P
C210	Ⓢ	ECCD1H470K	47P
C211	Ⓢ	ECQM1H153JZ	0.015
C214		ECEA1AU101	100
C301		ECEA1CU100	10
C303		ECEA1CU101	100
C306		ECQP1471JZ	470P
C307		ECEA1HK010	1
C308		ECEA1HK3R3	3.3
C309	Ⓢ	ECQM1H473JZ	0.047
C310		ECEA1HUR47	0.47
C313, 314		ECEA1HUR47	0.47
C315, 316	Ⓢ	ECQM1H273JZ	0.027
C401		ECEA1HK3R3	3.3
C402		ECEA1CU100	10
C701	Ⓢ	ECKD2H681KB	680P

Ref. No.		Part No.	Value
C702		ECEA1EU471	470
C703		ECEA1VU102	1000
C704	Ⓢ	ECKD1H103ZF	0.01
C705		ECEA1CU471	470
C706		ECEA1CU222	2200
C707	Ⓢ	ECKD1H103ZF	0.01
C708		ECEA1CU101	100
C902	Ⓢ	ECKD1H223ZF	0.022
C903	Ⓢ	ECEA25M4R7R	4.7
C904	Ⓢ	ECKD1H103ZF	0.01
C908, 909	Ⓢ	ECCD1H470K	47P
C910	Ⓢ	ECCD1H100KC	10P
C911, 912		EECW2R3A3R3E	3.3F
C913	Ⓢ	ECKD1H103ZF	0.01
C914		ECEA0JU102	1000

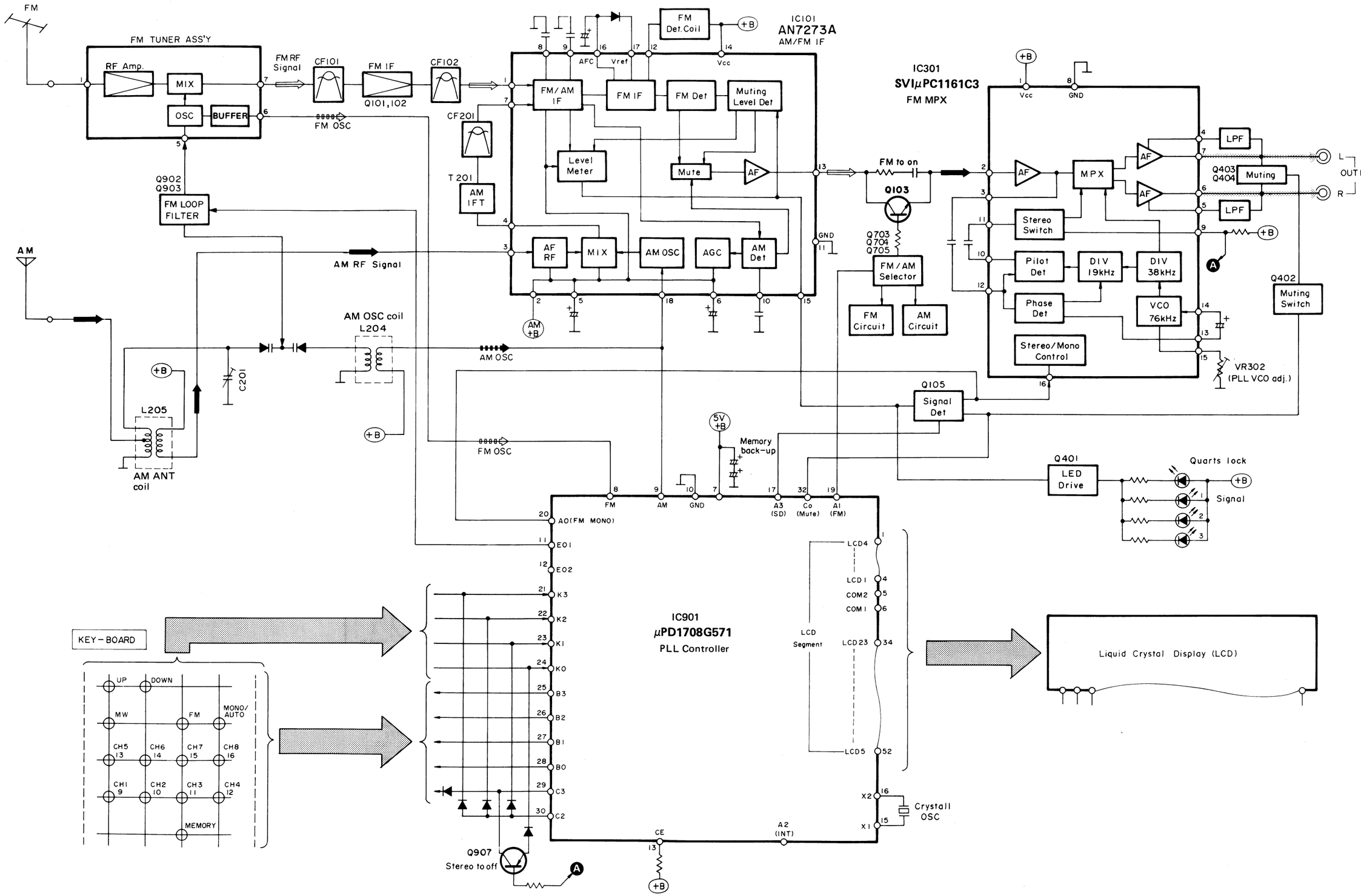
■ FUNCTION OF TERMINAL (PLL controller IC901)

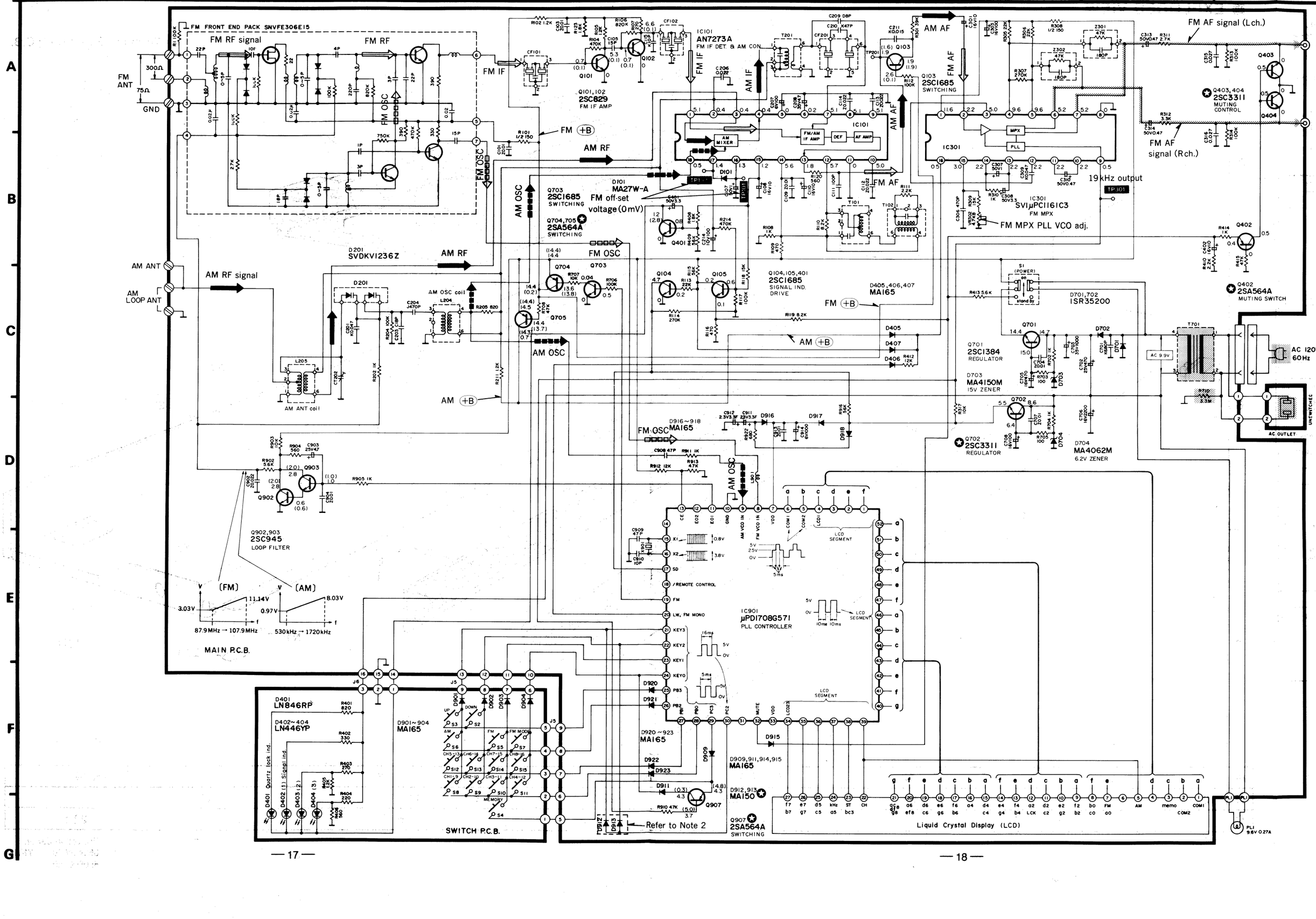
Pin No.	Mark	Description of terminal
1 ~ 4, 34 ~ 52	LCD4 ~ LCD1, LCD23 ~ LCD5	Segment signal output terminal for display.
5	COM2	Common signal output terminal connected to LCD. Output is delivered in 3 values of ground, 1/2V_{DD} and V_{DD} (at 5ms intervals) in a period of 50 Hz. The segment turns ON when the difference in voltage is ± V_{DD} between these terminals and LCD1 ~ LCD23.
6	COM1	
7	V_{DD}	Power supply terminal of device. Voltage of 5V ± 10% is supplied during operation of device. To hold the internal data memory (RAM), the voltage can be decreased to 2.5V. **Note:** Pins 7 and 33 are connected inside the chip. It is unnecessary to supply voltage to the pins.
33	V_{DD}	
8	FM	Input is local oscillator output (VCO) in a range of 10 ~ 130 MHz (0.3Vp-p, min.). There are 1/2 fixed frequency division prescaler and 2-step (1/32, 1/33) prescaler internally. Therefore, when deciding the frequency dividing value of programmable divider, it must be decided from the frequency obtained by halving the local oscillator output (VCO).
9	AM	Input is local oscillator output (VCO) in a range of 0.5 ~ 20 MHz (0.1Vp-p, min.). When the mode is shifted to FM, the AM terminal voltage automatically becomes the supply voltage of device.
10	GND	Ground terminal.
11	E01	When the divided oscillator frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
12	E02	
13	CE	Device selection signal input terminal. The signal level should be high when the device is operated, and low when not operated. With this terminal shifted to low level, LCD (liquid crystal display) turns off and the memory is held.
14	NC	Not used in this unit.
15	X1	Connecting terminal for crystal oscillator. The crystal connected is 4.5 MHz.
16	X2	
17	A3 (SD)	Terminal to put in stop signal during auto tuning. The voltage is 5V with broadcast received, and 0V without broadcast received.
18	A2	Not used in this unit.
19	A1	FM/AM output terminal. (FM → 5V, AM → 0V)
20	A0	Auto/mono changeover output terminal. (auto → 0V, mono → 5V)
21 ~ 24	K3 ~ K0	Input terminal for key return signal from external key matrix. 
25 ~ 28	B3 ~ B0	Output terminal for key return signal to external key matrix. 
29	C3	Terminal for FM IF ceramic filter frequency compensation. A pulse is generated when the voltage of terminal 13 rises.
30	C2	Output terminal for key return signal to let the stereo indicator light up. 
31	C1	Nut used in this unit.
32	C0	Muting signal output terminal. Muting signal is delivered during operation of FM/AM selector switch and tuning switch. (4V during muting)

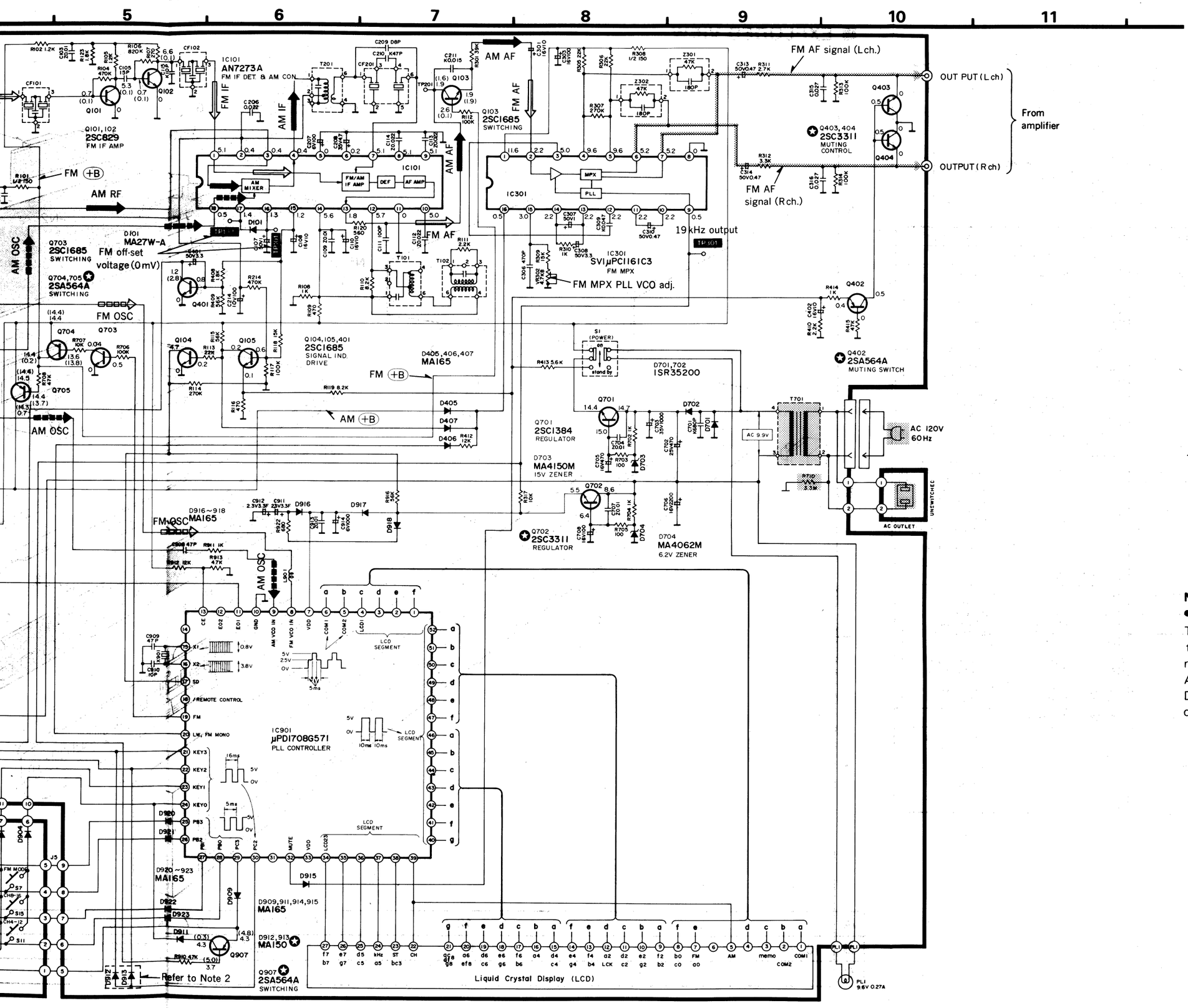
■ BLOCK DIAGRAM



■ BLOCK DIAGRAM




FM FRONT END PACK SNVFE306E15
FM RF signal
FM RF
FM OSC
FM ANT
300Ω
75Ω
GND
FM IF
IC101
AN7273A
FM IF DET. & AM CON
Q101
Q101,102
2SC829
FM IF AMP
Q102
FM (+B)
AM RF
AM OSC
Q703
2SC1685
SWITCHING
FM off-set voltage (0mV)
Q704,705
2SA564A
SWITCHING
D101
MA27W-A
AM MIXER
FM/AM IF AMP
DEF
AF AMP
FM AF
AM IF
Q103
2SC1685
SWITCHING
IC301
SVIμPCI161C3
FM MPX
MPX
PLL
FM MPX PLL VCO adj.
19kHz output
TP101
FM AF signal (Lch.)
FM AF signal (Rch.)
OUT PUT (L)
OUTPUT (R)
Q403,404
2SC3311
MUTING CONTROL
Q402
2SA564A
MUTING SWITCH
S1 (POWER)
on
stand by
D701,702
ISR35200
AC 9.9V
AC 120V 60Hz
UNSWITCHED
AC OUTLET
Q701
2SC1384
REGULATOR
D703
MA4150M
15V ZENER
Q702
2SC3311
REGULATOR
D704
MA4062M
6.2V ZENER
AM ANT
AM LOOP ANT
AM RF signal
D201
SVDKV1236Z
AM ANT coil
AM OSC coil
L204
L205
AM (+B)
Q704
Q703
Q705
Q104
Q105
Q401
Q104,105,401
2SC1685
SIGNAL IND. DRIVE
D405,406,407
MA165
D405
D407
D406
Q902,903
2SC945
LOOP FILTER
Q902
Q903
(FM)
3.03V
11.14V
87.9MHz → 107.9MHz
(AM)
0.97V
8.03V
530kHz → 1720kHz
MAIN P.C.B.
D916~918
MA165
FM OSC
AM OSC
IC901
μPD1708G571
PLL CONTROLLER
CE
EO2
EO1
GND
AM VCO IN
FM VCO IN
VDD
COM1
COM2
LCD
X1
X2
SD
/REMOTE CONTROL
FM
LW, FM MONO
KEY3
KEY2
KEY1
KEY0
PB3
PB2
PB1
PB0
KC3
KC2
MUTE
LCD23
LCD SEGMENT
D920
D921
D915
D909
D922
D923
D911
Q907
2SA564A
SWITCHING
Refer to Note 2
D909,911,914,915
MA165
D912,913
MA150
D920~923
MA165
D401
LN846RP
D402~404
LN446YP
Quartz lock ind.
Signal ind.
D901~904
MA165
SWITCH P.C.B.
UP
DOWN
MEMORY
AM
FM
FM MODE
Liquid Crystal Display (LCD)
PL1
9.6V 0.27A



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement part list.
* This is the basic circuit diagram of this unit.
  Note that part of the circuit is subject to change depending on the areas.

Note 1:

1. **S1** : Power source switch in "**on**" position.
2. **S2** : Tuning (down) switch.
   [down : tuning to lower frequency]
3. **S3** : Tuning (up) switch.
   [up : tuning to higher frequency]
4. **S4** : Memory set switch. (manual←→auto memory)
5. **S5** : FM selector switch.
6. **S6** : AM selector switch.
7. **S7** : FM mode switch. (stereo←→mono)
8. **S8 ~ S15** : Preset tuning switch.
   * With it momentarily pushed (less than 0.4 sec.) and released, the 1 ~ 8 CH are received.
   * With it continuously pushed (0.4 sec. or more) and released, the 9 ~ 16 CH are received.
9. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
   * Figures in ( ) stand for DC voltage in AM signal reception mode.
10. ——— Positive voltage lines ▒▒▒ AF signal lines
    ⇨ FM signal ▭▭▭▷ FM OSC ➡ AM signal ■■■▶ AM OSC

IMPORTANT SAFETY NOTICE

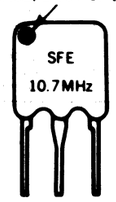
The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

Note 2:

• Use of ceramic filters in pairs

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three ranks. For this circuit , be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D912, D913) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking
(Red, Black or White)



RANK (Color)	D912	D913	CENTER FREQUENCY
Black	O	X	10.65 MHz
Red	X	X	10.70 MHz
White	X	O	10.76 MHz

Note: O Mark Diode is used.
X Mark Diode is not used.

★ Caution !

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
★ Cover the parts boxes made of plastics with aluminum foil.
★ Ground the soldering iron.
★ Put a conductive mat on the work table.
★ Do not touch the legs of IC or LSI with the fingers directly.

■ REPLACEMENT PARTS LIST

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The " Ⓢ " mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quantity per set.

Color	Areas
(K)	[M] ...U.S.A.
(K)	[MC]...Canada.

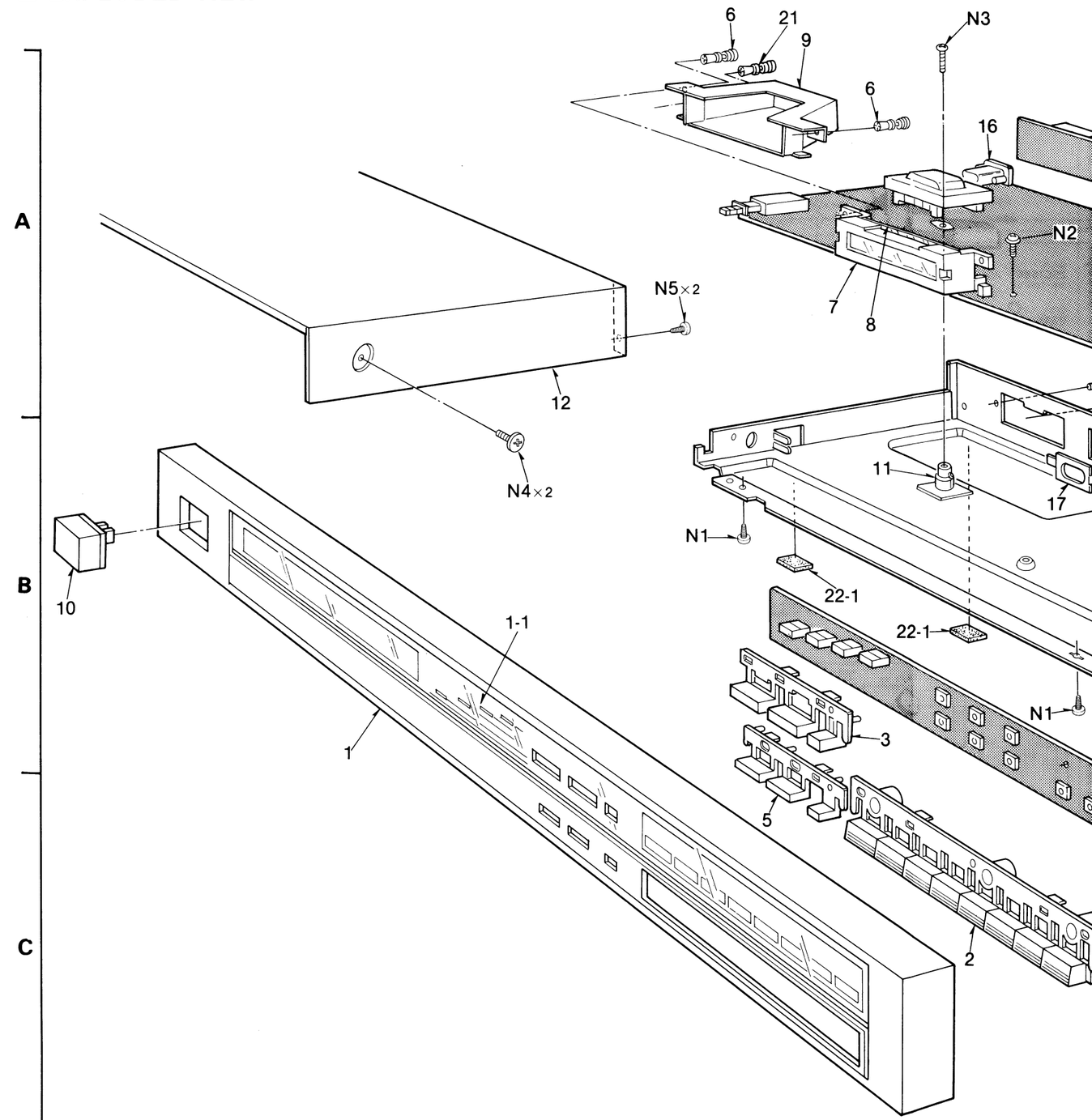
Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN7273A	Integrated Circuit
IC301	SVIμPC1161C3	Integrated Circuit
IC901	μPD1708G571	Integrated Circuit
TRANSISTORS		
Q101, 102	2SC829−C1	Transistor
Q103, 104, 105, 703	2SC1685−QNC	Transistor
Q401	2SC1685−QNC	Transistor
Q402, 704, 705 Ⓢ 907	2SA722−S	Transistor
Q701	2SC1384A−R	Transistor
Q902, 903 Ⓢ	2SC945P1	Transistor
Q403, 404, 702	2SC3311−Q	Transistor
DIODES		
D101	MA27W−A	Diode
D201	SVDKV1236Z	Diode
D401	LN846RP	LED
D402～404	LN446YP	LED
D405～407, 901～904, 909, 911, 915～918, 920～923	MA165	Diode
D701, 702	1SR35200	Rectifier
D703	MA4150M	Zener, 15V
D704	MA4062−M	Zener, 6.2V
D912, 913 Ⓢ	MA162A	Diode
COILS		
L204	SL02B7−M	OSC Coil
L205	SLA2B1−1M	Antenna Coil
L901	ELEPKR22MA	Choke Coil
TRANSFORMERS		
T101	SLI4B511−Z	FM IFT
T102	SLI4B513−Z	FM IFT
T201	SLI2B101−M	AM IFt
T701 ⚠	SLT5J238	Power Source
CERAMIC FILTERS		
CF101, 102	SVFE107MS8−A	FM, 10.7MHz (Red)
	SVFE107MS8−D	FM, 10.65MHz (Black)
	SVFE107MS8−E	FM, 10.75MHz (White)
CF201	SVFSFZ450F7L	AM, 450kHz

Ref. No.	Part No.	Description
CRYSTAL		
X901	SVQ43U452−D	4.5MHz Counter OSC
VARIABLE RESISTOR		
VR302	QVNB3A00B472	FM MPX VCO Adj.
VARIABLE CAPACITOR		
CT202	ECRHA010A11	AM Antenna
LAMP		
PL1	XAMS15S150	Lamp
COMPONENT COMBINATIONS		
Z301, 302	EXRP181K473T	180pF, 47kΩ
SWITCHES		
S1	SSH1196	Power Source
S2～15	SSG13	Preset, Band Selector, FM Mode, Tuning, Memory
LIQUID CRYSTAL DISPLAY		
LCD	SALLU1185−2	LCD
FM FRONT END		
	SNVFE306E15	FM Front End Pack

Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1	SGYTS77−KM	Front Panel Ass'y	(1)
1-1	SDU274C	Transparent Plate	(1)
2	SBC730−1	Preset Button	(1)
3	SBC728−2	Selector Button	(1)
5	SBCTS77−KM	Tuning Button	(1)
6	SHR415	Lock Pin	(5)
7	SHR9771	Holder	(1)
8	SDU249−4	Filter	(1)
9	SMP395−1	Case	(1)
10	SBC666−1	Power Button	(1)
11	SHE170	Spacer	(1)
12	SKC1750K99	Cabinet	(1)
13	SJS5327	Socket (3P)	(1)

Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
14	SJS5903	Socket (9P)	(1)
15 [M] ⚠	SJS9232B	AC Outlet	(1)
15 [MC]⚠	SJS9233B	AC Outlet	(1)
16 [M]	SJS9230	AC Inlet	(1)
16 [MC]	SJS9235	AC Inlet	(1)
17 [M]	SMX887	Shield Cover	(1)
18 [M]	SJS9232A	AC Outlet Cover	(1)
18 [MC]	SJS9233A	AC Outlet Cover	(1)
20	SJF8713N	Terminal Board	(1)
21	RHR969ZA	Lock Pin	(1)
22	SGPTS77−KM	Chassis Ass'y (W/Feet)	(1)
22-1	SKL297	Foot	(4)
SCREWS			
N1	XTB3+8GFZ	Tapping, ⊕3×8	(3)
N2	XTW3+8T	Tapping with Washer, ⊕3×8	(1)
N3	XTBS3+12F1	Tapping with Detent, ⊕3×12	(2)
N4	SNE2095−5	Cabinet	(2)
N5	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8	(5)
N6	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8	(1)
ACCESSORIES			
A1	SJP2129−5	Cord	(1)
A2	SSA269	FM Antenna	(1)
A3	SSA902−4	Loop Antenna	(1)
A4	SMA231	Holder (for set)	(1)
A5	SMA233−1	Holder (for rack)	(1)
A6	XTN3+10AFZ	Screw	(2)
A7 [M]	SQF12404	Instruction Book	(1)
A7 [MC]	SQF12512	Instruction Book	(1)
A8 [M]	SJA170	Power Source	(1)
A8 [MC]	SJA172	Power Source	(1)
PACKING PARTS			
P1	SPP734	Polyethylene Bag	(1)
P2	SPS4588	Left Side Pad	(1)
P3	SPS4589	Right Side Pad	(1)
P4	SPS4552	Upper Side Pad	(1)
P5	SPG5273	Carton Box	(1)

■ EXPLODED VIEW



| | | |

columns specify the
ns can be used for all

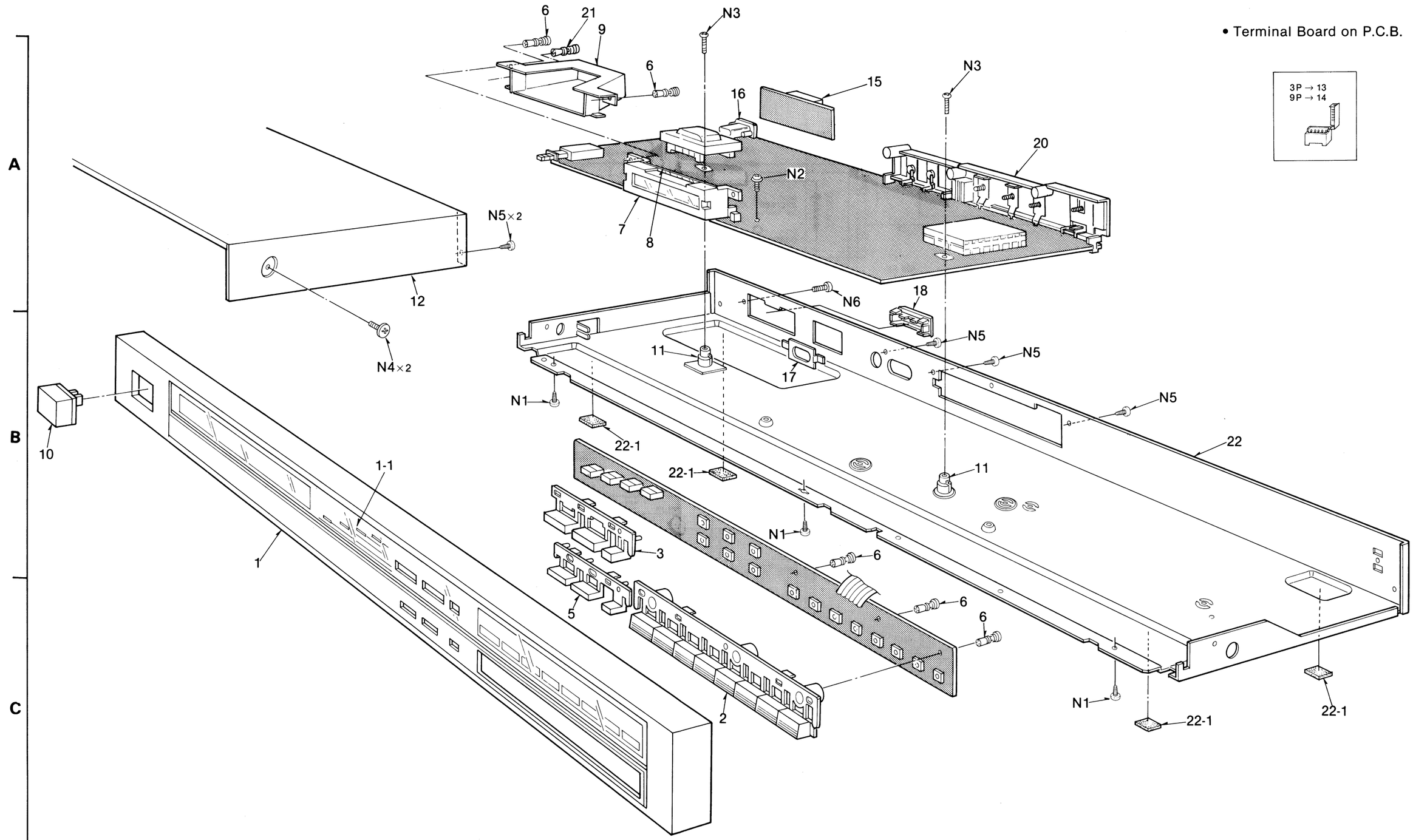
d parts and may differ

column of description

s

	Description	
S PARTS		
	Socket (9P)	(1)
	AC Outlet	(1)
	AC Outlet	(1)
	AC Inlet	(1)
	AC Inlet	(1)
	Shield Cover	(1)
	AC Outlet Cover	(1)
	AC Outlet Cover	(1)
	Terminal Board	(1)
	Lock Pin	(1)
	Chassis Ass'y (W/Feet)	(1)
	Foot	(4)
	Tapping, ⊕3×8	(3)
	Tapping with Washer, ⊕3×8	(1)
	Tapping with Detent, ⊕3×12	(2)
	Cabinet	(2)
	Tapping with Detent, ⊕3×8	(5)
	Tapping with Detent, ⊕3×8	(1)
	Cord	(1)
	FM Antenna	(1)
	Loop Antenna	(1)
	Holder (for set)	(1)
	Holder (for rack)	(1)
	Screw	(2)
	Instruction Book	(1)
	Instruction Book	(1)
	Power Source	(1)
	Power Source	(1)
	Polyethylene Bag	(1)
	Left Side Pad	(1)
	Right Side Pad	(1)
	Upper Side Pad	(1)
	Carton Box	(1)

■ EXPLODED VIEW



• Terminal Board on P.C.B.

| | | |